"EFFECT OF UPPER LIMB EXERCISE AND 10 MINUTES TREAD MILL TRAINING ON IMPROVING THE AUTONOMIC NERVOUS CONTROL IN COPD PATIENTS"

Dissertation work submitted to

THE TAMIL NADU DR. M. G. R. MEDICAL UNIVERSITY,

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Submitted by

Reg No:27102329

P.P.G. COLLEGE OF PHYSIOTHERAPY

9/1, Keeranatham road,

Saravanampatti,

Coimbatore-641035

www.ppgphysiotherapy.ac.in

DISSERTATION ENTITLED

"EFFECT OF UPPER LIMB EXERCISE AND 10 MINUTES TREAD MILL TRAINING ON IMPROVING THE AUTONOMIC NERVOUS CONTROL IN COPD PATIENTS"

Submitted by

Reg No. 27102329

Under the guidance of
Prof.B.G.RAJA ,M.P.T (Cardio-Resp),MIAP

Dissertation submitted to

THE TAMILN ADU Dr. M.G.R.MEDICAL UNIVERSITY,
CHENNAI-32.

Dissertation evaluated on ----------

Internal Examiner External Examiner

CERTIFICATE I

This is to certify that the dissertation entitled **"EFFECT OF UPPER LIMB EXERCISE AND 10 MINUTES TREAD MILL TRAINING ON IMPROVING THE AUTONOMIC NERVOUS CONTROL IN COPD PATIENTS" PROGRAM** was carried out by **Reg.No.27102329** P.P.G College of physiotherapy, Coimbatore-35, affiliated to the Tamilnadu Dr.M.G.R.Medical University, Chennai-32, under the guidance of **Prof. B.G.RAJA, M.P.T (Cardio-Resp)., MIAP.**

Prof. K.RAJA SENTHIL, M.P.T (Cardio-Resp)., MIAP., Ph.d

Principal

CERTIFICATE II

This is to certify that the dissertation entitled **"EFFECT OF UPPER LIMB EXERCISE AND 10 MINUTES TREAD MILL TRAINING ON IMPROVING THE AUTONOMIC NERVOUS CONTROL IN COPD PATIENTS"** was carried out by **Reg.No.27102329** P.P.G.College of physiotherapy, Coimbatore-35, affiliated to the Tamilnadu Dr.M.G.R Medical University, Chennai-32, under my guidance and direct supervision.

Prof. B.G.RAJA , M.P.T (Cardio-Resp), MIAP.

Professor

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ABSTRACT

OBJECTIVES

To analyse the effect of upper limb exercises along with treadmill training on heart rate and spo2 among copd subjects.

STUDY DESIGN

Pre test and post test experimental study.

METHODOLOGY

Subjects were assigned into two groups with 15 in GROUP A and 15 in GROUP B. The GROUP A subjects underwent for conventional therapy such as diaphragmatic breathing exercise and chest mobility exercise, while GROUP B underwent upper limb exercises and treadmill training along with conventional therapy.

Treadmill training is for 10 minutes daily, lasted for 8 weeks.

OUTCOME MEASURES

Heart rate and SPO_2 were measured by using pulsoximeter.

RESULTS

The data were analysed using independent and paired t test at 5%level of significance. There was significant difference between the groups in all the outcome measures. There was significant improvement on heart rate and SPO_2 in both groups, but the mean shows that GROUP B has more improvement than GROUP A.

CONCLUSION

The study reveal that there is significant improvement in heart rate and spo2 on subject who underwent upper limb exercises along with treadmill training.

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CHAPTER I

1.1 INTRODUCTION

The common disease entity of chronic bronchitis and emphysema is known as Chronic Obstructive Pulmonary Disease. COPD is defined as a disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually both progressive and associated with an abnormal inflammatory response of the lungs to noxious particle or gases GOLD, 2001. COPD is characterized by reduced maximum expiratory flow and slow forced emptying of lungs which is slowly progressive and mostly irreversible to present medical treatment ERS, 1995. The impairment of lung function is largely fixed but is partially reversible by bronchodilator or other therapy BTS,1997.COPD is largely preventable Huib,1999.

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of chronic morbidity and mortality throughout the world. For patients with COPD, degradation in lung function is progressive, leading to premature disability and death. As the lung function decreases, the ability to engage in activities of daily living decreases, and thus the quality of life is impaired.

The prevalence of COPD reported in different population studies from India is highly variable. The prevalence rates in male subjects of 2.12% studies reported from North are generally higher that 1.4% to 4.08% reported from south, respective range for female subjects vary from 1.3% to 4.9% from north and from 2.55% to south India, (Indian Journal of Chest Diseases And Allied Sciences,2004). The prevalence of COPD among all patients at Medical College Hospital, Trivandrum from January 2000 to December 2000 was found to be 30.23% with percentage of male patients 85.27 and of females 13.7 Sofia Salim et al., 2002.

It has been recognized that chronic obstructive pulmonary disease (COPD) is a systemic disease which has been shown to negatively affect the cardiovascular and autonomic nerve system.van Gestel AJR, Steier J. Autonomic dysfunction in patients with chronic obstructive pulmonary disease.

The autonomic nervous system (ANS) regulates multiple physiological processes. Amongst other factors it is responsible adjusting heart rate, blood pressure, gastrointestinal secretion, temperature regulation, vagally mediated reflex constriction of airway smooth muscle, secretion from sub mucosal glands, capillary permeability and

blood flow in the bronchial circulation, cardiovascular responses to exercise and release of mediators from the mast cells and other inflammatory cells. Dysfunctions of the autonomic nervous system are recognized by the symptoms that result from failure of the sympathetic or parasympathetic components. Disruption of autonomic reflexes with increased sympathetic tone, loss of parasympathetic tone and altered baroreceptor sensitivity (BRS) have been shown to be major risk factors for cardiac morbidity and mortality.

Chronic obstructive pulmonary disease (COPD) is associated with abnormal inflammatory response of the lungs to chronic inhalational of noxious inhaled gases or particles causing obstruction of the airways which is often irreversible. There is increasing evidence, indicating that COPD is more complex and not only involving airflow obstruction. It has been recognized that COPD is a systemic disease which has been shown to negatively affect the cardiovascular and autonomic nerve system

The upper extremities play an important role in many activities of daily living such as bathing, dressing, hanging out the wash, and gardening. Patients with COPD frequently experience marked dyspnea and fatigue when performing these simple tasks. Upper limb activities commonly require unsupported arm exercise, which poses a unique challenge for patients with COPD, whose upper limb muscles are required to act as accessory muscles of respiration The effectiveness of lower limb (LL) exercise training for patients with COPD has been well documented, with consistent and clinically significant improvements in exercise capacity, symptoms, and quality of life.

The benefits of combined upper limb and lower limb training, however, are less well defined. Therefore, there exists a need to measure the exercise performance and the functional outcome by combining unsupported upper limb exercises with lower limb exercises.

COPD is a major cause of morbidity, mortality and health care costs. Exercise intolerance is one of the most troublesome manifestations of COPD. Patients in initial stages of the disease may experience dyspnoea during heavy exertion that is attributed to "slowing down with age." Patients with moderate and severe COPD commonly have difficulty performing normal daily tasks such as work, recreational exercise, hobbies, and self-care. Dyspnoea, leg fatigue, and discomfort are the main symptoms that limit exercise. The resultant inactivity leads to a progressive deterioration that further increase the respiratory effort related to any given task. Ultimately, patients often become progressively homebound and isolated, and may develop worsening depression and

anxiety. Such depression is associated with significant disturbances in physical function. Indeed, exercise capacity and healthstatus also correlate inversely with morbidity.

The management of COPD has advanced significantly over the past few years. In particular, pulmonary rehabilitation has gradually been accepted as the gold standard of care for patients with COPD. Recent evidence-based guidelines (12) have considered exercise training a necessary and critically important part of pulmonary rehabilitation if desired results are to be achieved. Over the recent years, researchers and clinicians have increasingly recognised the role of skeletal muscle dysfunction as an indicator of advanced stages of COPD. The physical exercise component has therefore become a mainstay of respiratory rehabilitation. Several studies have shown that physical exercise can reverse COPD induced skeletal muscle dysfunction as well as the morphological and metabolic changes of skeletal muscles. There is; however, substantial variation in exercise protocols used in clinical trials. This variation feeds an ongoing debate on the optimal exercise protocol and on how the general impact of modifying principles, training. Intensity, specificity, and reversibility known from healthy subjects can be applied to COPD patients.

1.2 NEED FOR THE STUDY

It has been recognized that chronic obstructive pulmonary disease (COPD) is a systemic disease which has been shown to negatively affect the cardiovascular and autonomic nerve system. In COPD patients the activity of sympathetic nerves may be affected by recurrent hypoxemia, hypercapnia, increased intrathoracic pressure swings due to airway obstruction, increased respiratory effort, systemic inflammation and the use of betasympathomimetics. Furthermore, experimental findings suggest that autonomic dysfunction characterized by a predominance of sympathetic activity can significantly modulate further inflammatory reactions.

Effective positioning, relaxed breathing techniques, postural drainage, technique to aid secretions are the recognized treatment intervention for these patients. Respiratory muscle stretching is not that much relevant during these treatment programme . So interventions to improve efficiency of respiratory muscles is important in the rehabilitation of COPD patients.

COPD is a condition which has a wide variety of treatment program such as exercises, treadmill, breathing ex. Usually these treatment programs gives less important to autonomic nervous system. So in this study the researcher is trying to find out the **efficacy of Upper Limb Exercise and 10 minutes Treadmill Training on Improving Autonomic Nervous control in patients with COPD .**

1.3 AIM AND OBJECTIVES OF STUDY

AIM OF THE STUDY

To find out the Efficacy of Upper Limb exercise and 10 minutes Treadmill Training to improve Autonomic Nervous control in patients with COPD.

OBJECTIVES OF THE STUDY

- To find out the effectiveness of conventional therapy for treatment of COPD.
- To find out the effectiveness of conventional therapy with Upper Limb exercises and 10 minutes Treadmill training on Improving Autonomic Nervous control in patients with COPD .
- To compare the effectiveness of both Upper Limb exercises and 10 minutes Treadmill Exercise and conventional treatment on Improving Autonomic Nervous control in patients with COPD .

1.4 HYPOTHESIS

Null Hypothesis– There is no significant improvement Autonomic Nervous control in COPD patients with Upper limb exercises and 10 minutes Treadmill Training.

Alternate Hypothesis- There is significant improvement Autonomic Nervous control in COPD patients with Upper Limb exercises and 10 minutes Treadmill Training.

1.5 OPERATIONAL DEFINITION

COPD- chronic obstructive pulmonary disease is comprised primarily of three related conditions- chronic bronchitis, chronic asthma, and emphysema. In each condition there is chronic obstruction of the flow of air through the airways and out of the lungs, and the obstruction generally is permanent and may be progressive over time.

Faling J

Autonomic Nervous Control- ANS is the part of peripheral nervous system that acts as a control system functioning largely below the level of consciousness and controls visceral functions. **Stewart marsh**

Treadmill- a treadmill is an exercise machine for running or walking while staying in one place.

Costello V

Upper Limb Exercise-Exercise that is design to strenghten upper limb muscles.

Farlex

Heart Rate-Number of heart rate per unit of time usually expressed as beats per minute.

Hougston misslin

SPO_2-Oxgyen saturation refers to the amount of oxygen carried in red blood cells.

Leigh.a.zaykoski

CHAPTER II

REVIEW OF LITERATURE

American Thoracic Society,(2008)defined chronic obstructive pulmonary disease [COPD] is a preventable and treatable disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and is associated with an abnormal inflammatory response of lungs to noxious particles or gases, primarily caused by cigarette smoking. Although COPD affects lungs, it also produces significant systemic consequences.

WHO, (2008) defined COPD as a disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually both progressive and associated with an abnormal inflammatory response of the lung to noxious particles or gases.

Satsharma et al., (2007) defined COPD as a disease state characterized by the presence of airflow obstruction due to chronic bronchitis or emphysema. The airflow obstruction generally is progressive, may be accompanied by airway hyper reactivity and may be partially reversible.

Satsharmaet al., (2007)reported that the primary cause of COPD is exposure to tobacco smoke. Clinically significant COPD develops in15 % of cigarette smokers. Age of initiation of smoking, total pack-years, and current smoking status predict COPD mortality. Airway hyper responsiveness stipulates that patient who has non-specific airway hyper reactivity and who smoke are at increased risk of developing COPD with an accelerated decline in lung function.

Henke O.M et al.,(2006) commended that the anatomic disruption, ciliary impairment, plasma exudation and fibrin can change the viscoelasticity of the mucus and impair the surfactant properties of the airway lining material cause small airway obstruction and gas trapping. These changes in mucus clearance lead to ventilation-perfusion mismatch, impaired gas exchange, pulmonary hyperinflation, and inspiratory loading of the respiratory muscles leading to fatigue and ineffective cough.

VanGestel AJR, SteierJIt(2006) has been recognized that chronic obstructive pulmonary disease (COPD) is a systemic disease which has been shown to negatively

affect the cardiovascular and autonomic nerve system. The complexity of the physiologic basis by which autonomic dysfunction occurs in patients with COPD.

Stein PK, Nelson P(2006) It has been recognized that COPD is a systemic disease which has been shown to negatively affect the cardiovascular and autonomic nerve system

Volterrani M, Scalvini S, Mazzuero G(2006) Patients with COPD have functional alterations of cardiac autonomic modulation as reflected in elevated resting heart rate, reduced baroreflex sensitivity, reduced heart rate variability (HRV)

Eckhart and colleagues(2005) found evidence that the respiratory pattern influences autonomic output by inhibiting the ability of baroreceptor inputs to modulate the activity of autonomic motoneurons. The influence of the respiratory pattern on cardiac autonomic modulation is well known: the magnitude of parasympathetic induced heart rate variability has been shown to depend on both the lung hyperinflation (tidal volume VT) and respiratory rate (FR)

Hough A, (2005)stated that a common disease entity of chronic bronchitis and emphysema is known as chronic obstructive pulmonary disease. COPD is a slowly progressive disease and most airways obstruction is fixed, although some reversibility may be demonstrated with medication

Fabbri L.M et al., (2005)conducted a study and that showed the prevalence of COPD determined by criteria of GOLD was 17.2 % among subjects older than 45 year. Prevalence increased with increasing age, especially in males, in those with more than 20 pack, years of smoking, and in low-income subjects.

Aggarwal A.N. et al., (2004) stated that the prevalence of COPD reported in different population studies from India is highly variable. The prevalence rates in male subjects of 2.12%studies reported from North are generally higher that 1.4% to 4.08% reported from South, respective range for female subjects vary from 1.3% to 4.9 % from North and from 2.55% to South India.

Agustı´ AGN, Cotes J, Wagner PD (2004) cardiac output appears to increase normally during exercise, even in severe COPD

Raupach T, Bahr F(2004) It may be postulated, that the development of a rapid shallow breathing pattern during an exacerbation or exercise probably is a contributor to autonomic dysfunction in patients with COPD.

Stewart,Marsh(2003) Cardiovascular autonomic nerve function, arterial oxygen and carbon dioxide tensions, lung function and cigarette consumption were also recorded. The acetylcholine sweat-spot test was highly repeatable in eight COPD patients, no person with normal or frankly abnormal function being wrongly assigned.

Starr J. A,(2001) stated that in COPD chronic inflammation from inhaling pollutants causes hypertrophy of glands and goblet cells results in excessive mucus production, which either partially or completely obstruct the airway. Decrease in ciliary function also impair airway clearance and contribute to airway obstruction. When excessive secretions are present in an airway, air can be inspired around the secretion. During exhalation only small amount of air escapes before the airway close down around the secretion, trapping air distal to the mucus accounts for hyperinflation.

Allen M.B et al., (2001)stated that the patient with COPD will have impairment of expiratory flow , best measured by spirometry. Blood gases should be performed to identify the severity of hypoxemia and decide if oxygen therapy is required. Chest X -ray is important, not for confirming the diagnosis of COPD but to exclude the other reasons for the presentation.

Bernardi L(1999) Autonomic abnormalities have consistently been found in COPD. These span from a reduction in the heart rate variability, a reduction in the respiratory sinus arrhythmia and a reduction in the baroreflex sensitivity, together with a direct increase in the muscle sympathetic nerve activity.

Arch physical med rehabilitation(1999) .The findings demonstrate that a treadmill exercise program based on stress test data can increase the efficiency and thus exercise tolerance of persons with COPD.

Marcelo Fernandez(1997) did study in efficiency of diaphragmatic breathing exercise in patients with COPD.Diaphgramatic breathing exercise can improve breathing pattern and ventilatory efficiency.

Thomson A, (1995) commended that COPD is more common in middle to late adult life and in men more than women (ratio 5:1) .It is more common in urban areas than in rural areas

CHAPTER III

MATERIALS AND METHODOLOGY

3.1 MATERIALS

- Data collection sheet
- Consent form
- Stethoscope
- Pillow
- Chair
- Table
- Treadmill
- Pulsoximeter

3.2 METHODOLOGY

3.2.1 Study Design

Quasi Experimental Study, Design with pretest and posttest evaluation of both in experimental and control group.

3.2.2 Sampling Design

Purposive random sampling technique

3.2.3 Population

The sample consists of 30 subjects with COPD were selected and assigned into two groups.

Control Group

It consist of 15 COPD patients treated with diaphragmatic breathing exercise and chest mobility (conventional treatment).

Experimental group

It consists of 15 COPD subjects treated with Upper Limb Exercise and 10 minutes Treadmill training along with conventional therapy.

3.2.4 Sample

30 subjects

3.2.5 Selection criteria

3.2.5.1 Inclusions Criteria

- Patients with mild to moderate COPD
- Age 45 – 60
- Males

3.2.5.2 Exclusion Criteria

- Malignancy
- Lung surgeries
- Cardiac Surgeries
- Neurological problems
- Mental retardation
- Recent fractures to ribs
- Visual and auditory problem
- Non cooperative patient

3.2.6 Study setting

Ashwini multi-speciality hospital ,Coimbatore.

Kovai respiratory care centre, Coimbatore.

3.2.7 Study duration

6 months

3.2.8 Treatment duration

8 weeks

3.2.9 Parameter

Pulsoximeter

3.2.10 Outcome measure

Heart rate, SPO_2

3.2.11 Study procedure

Written consent was being obtained from the patient. Each patient will undergo formal evaluation of inclusion in to the study. Before starting the treatment the complete procedure was explained to the patients.

Thirty subjects who are satisfied with inclusion criteria are randomly allocated to GROUP A or GROUP B. Pre-test assessment is taken before going to training programme. Training programme for GROUP B consisted of upper limb exercises and 10 minutes of treadmill exercise along with conventional therapy. For the GROUP A subjects, diaphragmatic exercise and chest mobility are given.

Post-test assessment is taken at the end of 8 weeks.

3.2.12 Statistical tool

Pre test and Post test values of the study will be collected and assessed for variation in the improvement and their results will be analyzed using Independent ‘ t’ test and Paired ‘t’ test.

INDEPENDENT `t' TEST (between groups)

$$t = \frac{\overline{X1} - \overline{X2}}{S} \sqrt{\frac{n_1 n_2}{(n_1 + n_2)}}$$

Where,

$$S = \sqrt{\frac{\sum d_1^2 + \sum d_2^2}{n_1 + n_2 - 2}}$$

PAIRED `t' TEST (within groups)

$$t = \frac{\bar{d}\sqrt{n}}{S}$$ Where,

$$\mathbf{S} = \sqrt{\frac{\sum d^2 - [\bar{d}]^2 \times n}{n-1}}$$

S=combined standard deviation

$d_1 \& d_2$ =difference between initial & final readings in group A & group B respectively.

$n_1 \& n_2$=number of patients in group A & group B respectively.

$\overline{X_1} \& \overline{X_2}$ =Mean of group A & group B respectively.

Level of significance: 5%.

3.2.13 Treatment Technique

Thirty subjects who are satisfied with inclusion criteria are randomly allocated to GROUP A or GROUP B. Pre-test assessment is taken before going to training programme.

Training programme for GROUP B consisted of upper limb exercises and 10 minutes of treadmill exercise along with conventional therapy . The exercises are the following:

A, Throwing a ball against the wall with arms above horizontal in sitting position.
B, Passing a bean bag over the head in sitting position.
C, Exercise on over head pulleys in sitting.
D, Moving ring across a wire without touching a wire while arm was above horizontal. Duration -40 seconds following 20 second rest for each exercise for 4 times in 4 minute.

For the GROUP A subjects, diaphragmatic exercise and chest mobility exercise are given. The subject is asked to place his both palms just below the ribcage. The subject is instructed to inhale through the mouth during which his abdomen moves forward and then exhale through the mouth. The subject should do this exercise on a regular basis for 10 minutes.

Post-test assessment is taken at the end of 8 weeks

CHAPTER IV

DATA PRESENTATION

TABLE –I

CONTROL GROUP (GROUP - A)

S.NO	HEART RATE		SPO_2	
	Pre test	**Post test**	**Pretest**	**Post test**
1	80	78	89	91
2	90	88	90	91
3	95	94	88	90
4	99	97	88	89
5	89	88	91	91
6	95	93	90	92
7	100	98	90	91
8	99	97	92	93
9	97	95	89	92
10	83	81	89	93
11	91	91	90	92
12	89	88	91	92
13	92	91	88	91
14	91	90	87	90
15	89	88	89	97

TABLE –II

EXPERIMENTAL GROUP (GROUP - B)

S.NO	HEART RATE		SPO_2	
	Pre test	Post test		Pre test
1	80	73	90	94
2	90	80	89	94
3	95	83	87	93
4	97	90	89	95
5	99	91	92	96
6	89	79	91	95
7	88	72	89	94
8	100	93	91	96
9	97	90	90	95
10	83	80	90	95
11	92	87	89	94
12	90	84	90	93
13	93	86	87	92
14	91	84	88	93
15	89	85	90	95

CHAPTER V

DATA ANALYSIS AND INTERPRETATION

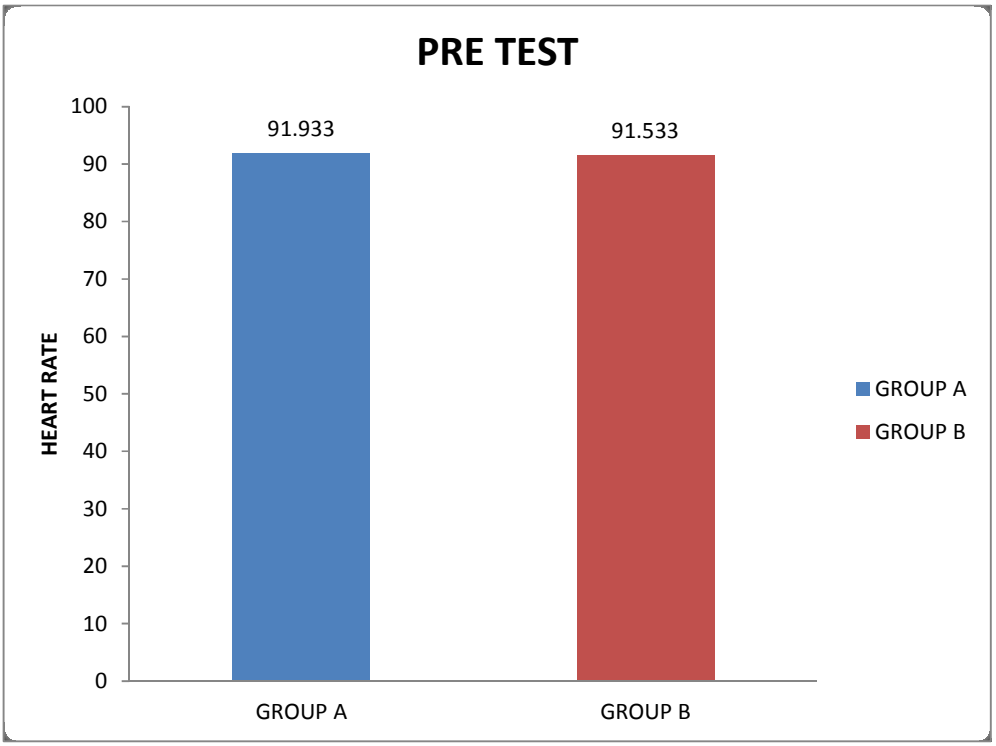
PRE and Post values of Heart rate in Group A and Group B

Table III INDEPENDENT‘t’ TEST

	PRE TEST		POST TEST	
	GROUP A	**GROUP B**	**GROUP A**	**GROUP B**
MEAN	91.933	91.533	90.466	83.800
Calculated’t’ value	0.193		3.070	
p value and Level of significance	p >0.05 and not significant		p <0.05 and significant	

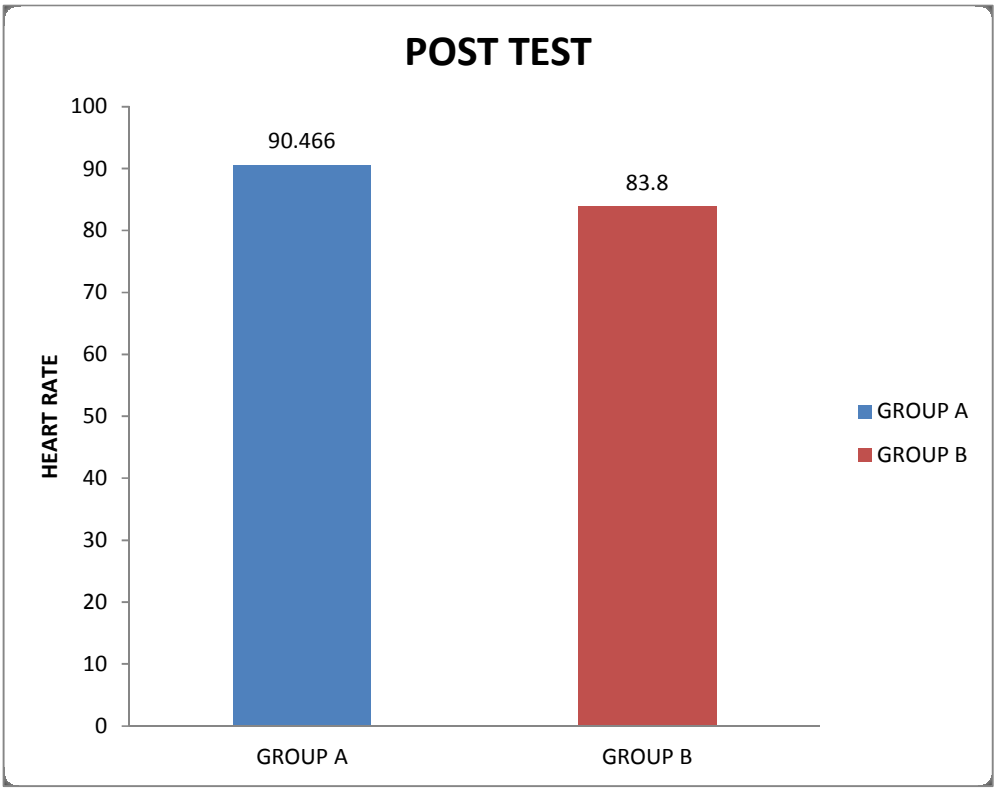
MEAN DIFFERENCE BETWEEN GROUP A AND GROUP B – PRE TEST (HEART RATE)

GRAPH 1



MEAN DIFFERENCE BETWEEN GROUP A AND GROUP B – POST TEST (HEART RATE)

GRAPH 2



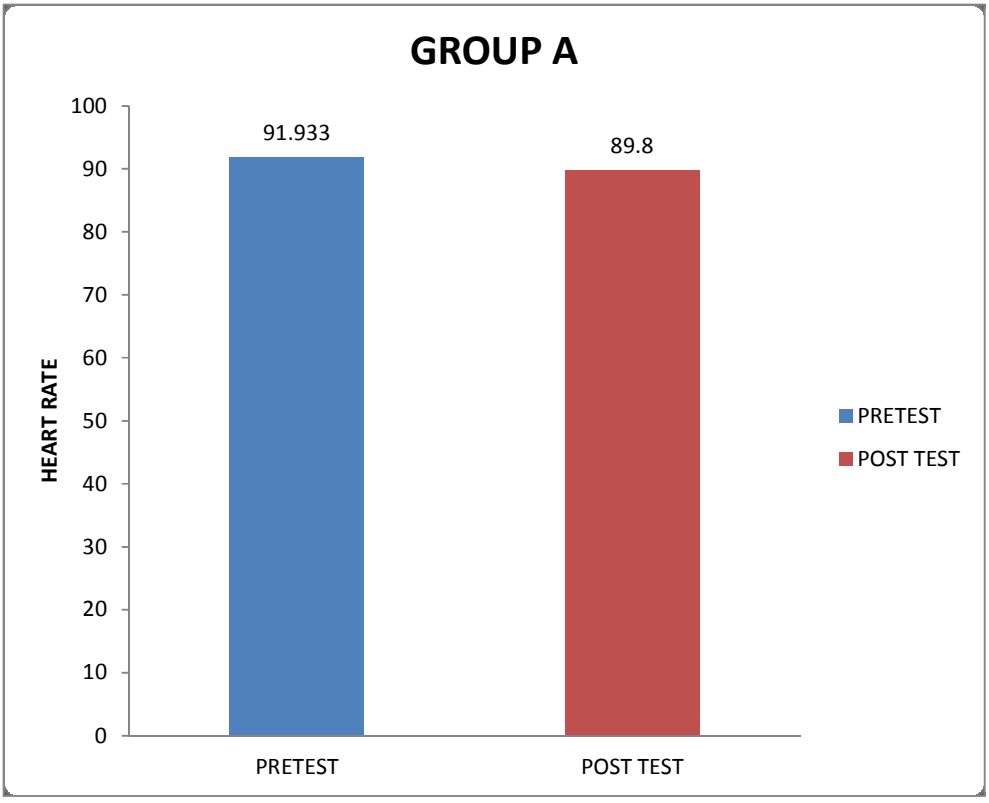
PRE and Post values of Heart rate in Experimental group and Control group

Table IV PAIRED‘t’ TEST

	GROUP A		GROUP B	
	PRE TEST	**POST TEST**	**PRE TEST**	**POST TEST**
MEAN	91.933	89.800	91.533	83.800
Calculated’t’ value	2.951		9.245	
p value and Level of significance	p <0.05 and significant		p <0.05 and significant	

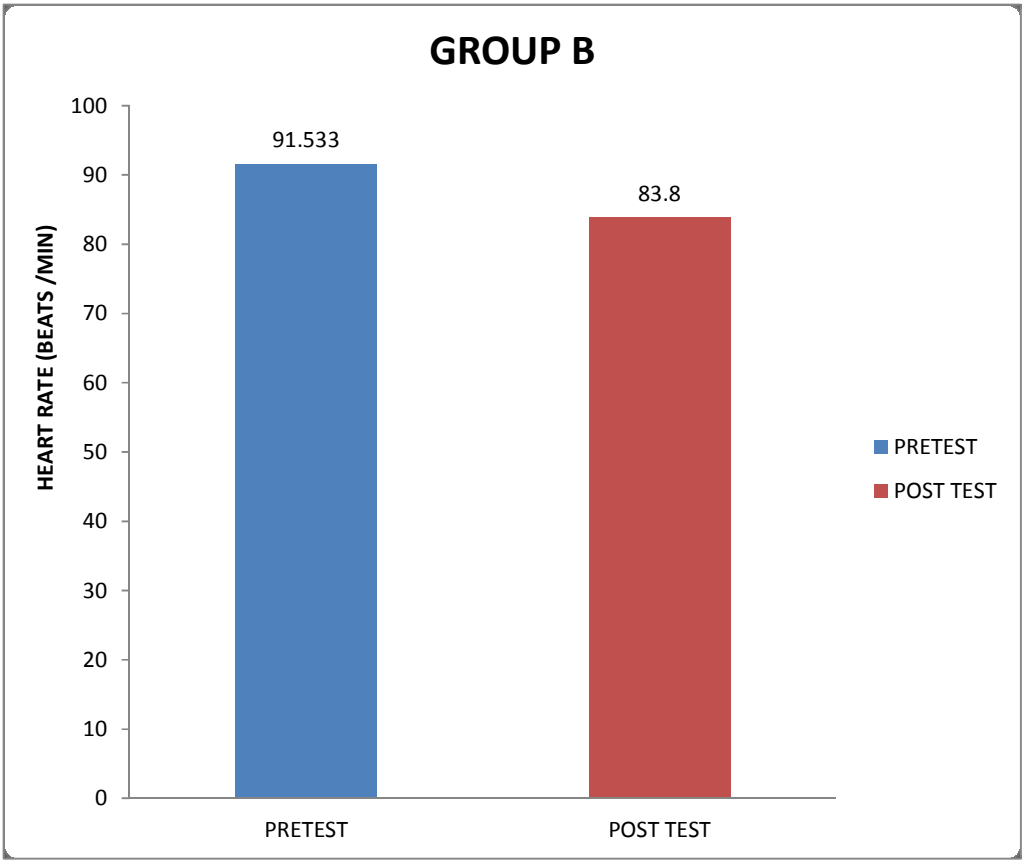
MEAN DIFFERENCE BETWEEN PRE AND POST TEST GROUP A (HEART RATE)

GRAPH 3



MEAN DIFFERENCE BETWEEN PRE AND POST TEST GROUP B (HEART RATE)

GRAPH 4



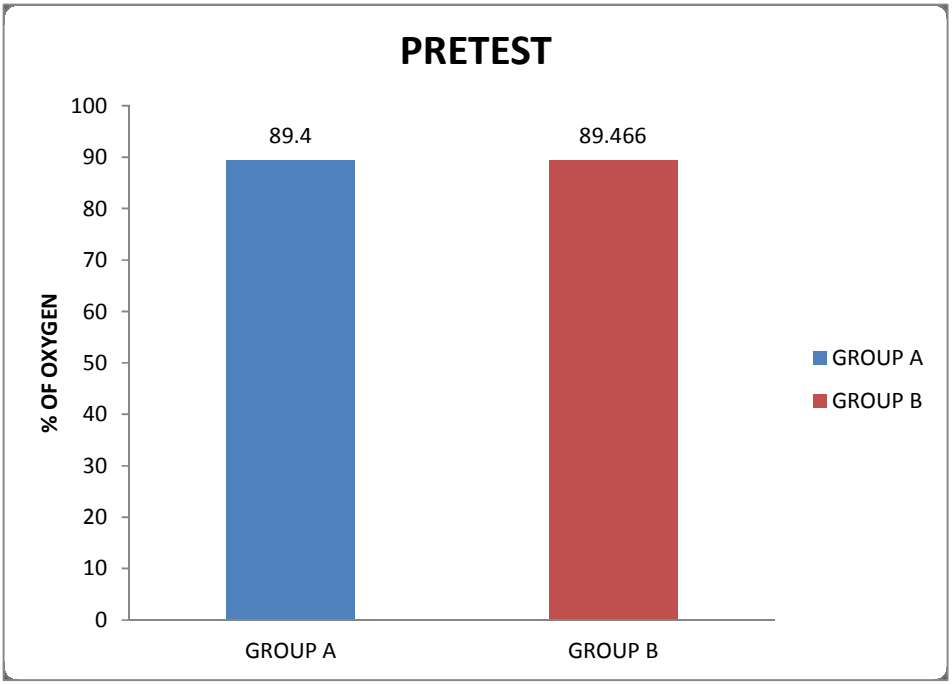
PRE and Post values of SPO_2 in Group A and Group B

Table V INDEPENDENT 't' TEST

	PRE TEST		POST TEST	
	GROUP A	**GROUP B**	**GROUP A**	**GROUP B**
MEAN	89.400	89.466	91.266	94.266
Calculated't' value	0.132		7.259	
p value and Level of significance	p >0.05 and not significant		p <0.05 and significant	

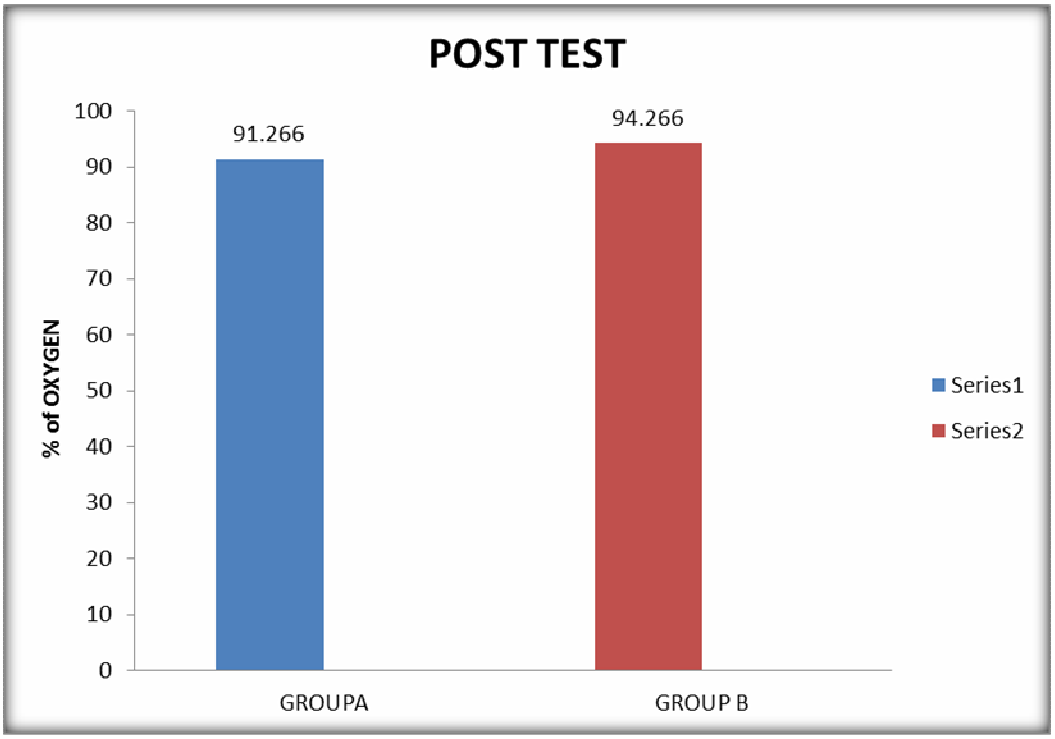
MEANS DIFFERENCE BETWEEN GROUP A AND GROUP B –PRE TEST (SPO_2)

GRAPH 5



MEANS DIFFERENCE BETWEEN GROUP A AND GROUP B – POST TEST (SPO_2)

GRAPH 6



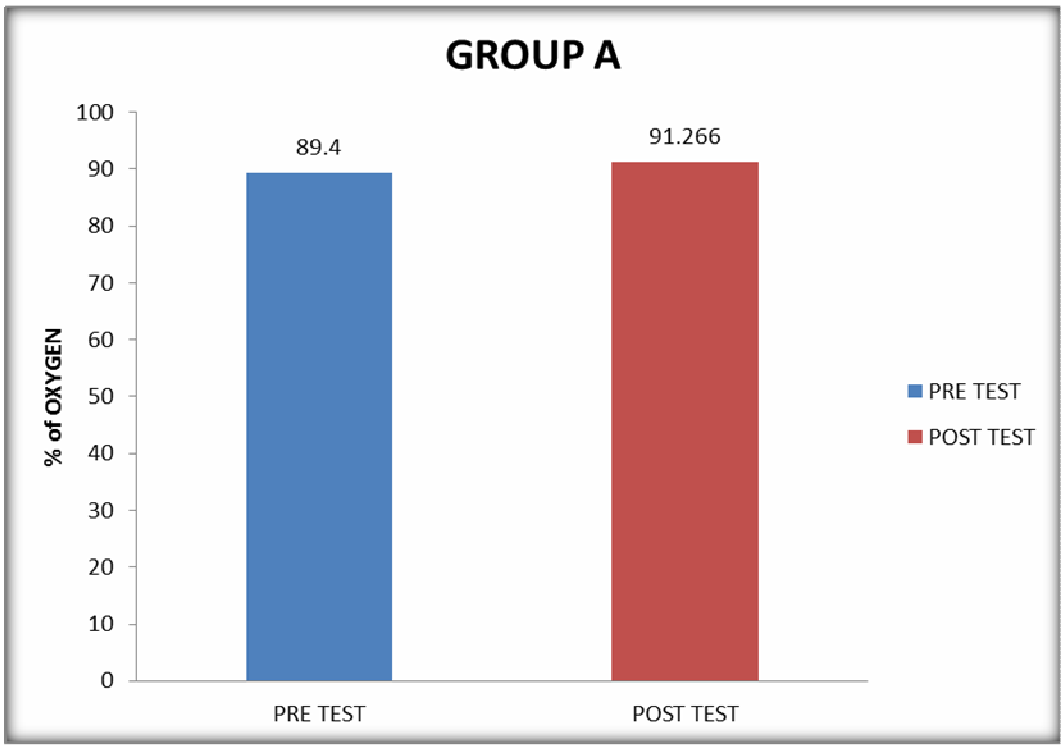
PRE and Post values of SPO_2 in Experimental group and Control group

Table 6 PAIRED‘t’ TEST

	GROUP A		GROUP B	
	PRE TEST	**POST TEST**	**PRE TEST**	**POST TEST**
MEAN	89.400	91.266	89.466	94.266
Calculated’t’ value	6.820		24.00	
p value and Level of significance	p <0.05 and significant		p <0.05 and significant	

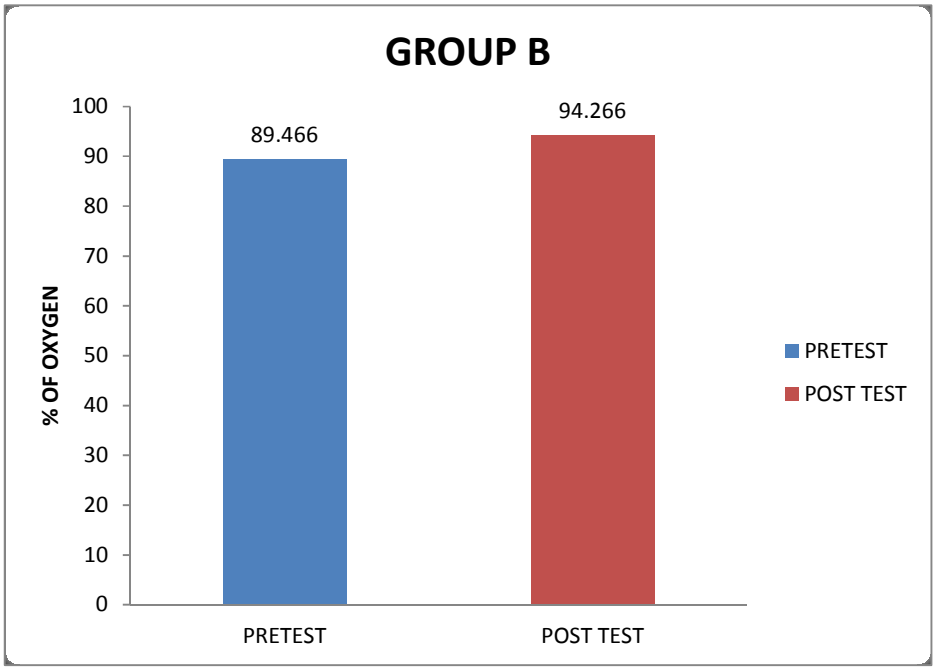
MEAN DIFFERENCE BETWEEN PRE AND POST TEST GROUP A (SPO_2)

GRAPH 7



MEAN DIFFERENCE BETWEEN PRE AND POST TEST GROUPB (SPO_2)

GRAPH 8



CHAPTER VI

RESULTS

Effectiveness of experimental group and control group was measured by comparing pre test and post test values in heart rate and SPO_2.

The pre test values of both the groups were analysed using independent‘t’ test. For 28 degrees of freedom and 5% level of significance, the table‘t’ value is 2.048 and the calculated ‘t’ value is 0.193. As the calculated‘t’ value was lesser than the table‘t’ value, there was no significant difference between the pre test values of both groups. Hence there was homogeneity between both the groups before the intervention.

The post test values of both the groups were analysed using independent‘t’ test. For 28 degrees of freedom and 5% level of significance, the table‘t’ value is 2.048 and the calculated ‘t’ value is 3.070 . As the calculated‘t’ value was greater than the table‘t’ value, null hypothesis is rejected. Hence there is significant difference between Group A and Group B .

The pre test and post test values of heart rate was analysed using paired‘t’ test. For 14 degrees of freedom and at 5% level of significance, the table‘t’ value is 2.145 and the calculated ‘t’ value was 2.951. As the calculated‘t’ value was greater than the table‘t’ value, null hypothesis was rejected. Hence there was significant effect of diaphragmatic breathing exercise on heart rate.

The pre test and post test values of heart rate were analysed using Paired't' test. For 14 degrees of freedom and at 5% level of significance, the table't' value is 2.145 and the calculated 't' value was 9.245. As the calculated't' value was greater than the table't' value, null hypothesis was rejected. Hence there was significant effect of stretching and tread mill exercise on heart rate.

The pre test values of both the groups were analysed using independent't' test. For 28 degrees of freedom and 5% level of significance, the table't' value is 2.048 and the calculated 't' value is 0.132. As the calculated't' value was lesser than the table't' value; there was no significant difference between the pre test values of both groups. Hence there was homogeneity between both the groups before the intervention.

The post test values of both the groups were analysed using independent't' test. For 28 degrees of freedom and 5% level of significance, the table't' value is 2.048 and the calculated 't' value is 7.259 . As the calculated't' value was greater than the table't' value, null hypothesis is rejected. Hence there is significant difference between Group A and Group B.

The pre test and post test values of SPO_2 was analysed using Paired't' test. For 14 degrees of freedom and at 5% level of significance, the table't' value is 2.145 and the calculated 't' value was 6.820. As the calculated't' value was greater than the table't' value, null hypothesis was rejected. Hence there was significant effect of diaphragmatic breathing exercise on SPO_2.

The pre test and post test values of$SPO_2$was analysed using Paired't' test. For 14degrees of freedom and at 5% level of significance, the table't' value is 2.145 and the calculated 't' value was 24.000. As the calculated't' value was greater than the table't'

value, null hypothesis was rejected. Hence there was significant effect of stretching and treadmill exercise on Spo_2.

The study reveal that there is significant improvement in heart rate and spo2 on subject who underwent upper limb and lower limb stretching along with treadmill training.

CHAPTER VII

DISCUSSION

In COPD subjects basically there is high heart rate and low oxygen saturation.so here we are trying to give an effective treatment to improve the heart rate and oxygen saturation. In this study, after getting consent,30 subject were taken and randomly allocated to 15 in GROUP A and others in GROUP B.Upper limb exercises and 10 minutes treadmill training along with conventional therapy were administered to GROUP B subjects and diaphragmatic breathing exercise and chest mobility exercise were suggested to GROUP A subjects as conventional therapy.Pre-test and post-test assesment were taken on the basis of two outcome measures. Heart rate and SPO_2 were measured using the pulsoximeter.Data were statistically analyse by using independent and paired t test.

Pre test measurement shows homogeneity between the groups.post test measurement shows a significant difference between the groups in heart rate and SPO_2.

In GROUP A, diaphragmatic breathing exercise and chest mobility exercise were given, There was a significant difference in heart rate and SPO_2.It helped the subjects to modify his attitude towards work and thereby reducing his anxiety. It was associated with a significant increase in tidal volume and reduction in breathing frequency, leading to higher ventilation and O_2saturation, with reduction in dead space and ventilatoy equivalent forCOPD. Diaphragmatic breathing and chest mobility exercises can also improve breathing patternand ventilator efficiency.

In GROUP B,where upper limb exercise and 10 minutes treadmill training were given along with conventional therapy,there was a significant difference in heart rate and spo2.These exercises helped in exercise capacity,improves endurance and reduce o_2 consumption at given work load.This intent helped to increase the saturation of o_2 and decreases the heart rate.The complexity of training induced regulatory changes is well illustrated by the effects on heart rate.Normal heart rate response to exercise is mediated by a combination of vagal withdrawal and beta adrengic stimulation.

CHAPTER VIII
SUMMARY AND CONCLUSION

SUMMARY

This study was conducted to analyse the effectiveness of upper limb exercises and 10 minutes treadmill training on COPD patients. It was conducted in two groups. GROUP B received upper limb exercises and 10 minutes tread mill training along with conventional therapy. While GROUP B received diaphragmatic breathing exercise and chest mobility exercise, which lasted for 8 weeks. Heart rate and SPO_2 were noted before and after training.

The statistical analyse using paired t test at 5% level of signifance showed that there was significant improvement heart rate and SPO_2 within the groups. The mean showed that GROUP B subjects had more significant improvement than GROUP A.Also the statistical analysis using independent t test at 5% level of significance showed that there was significant difference in heart rate and SPO_2.

CONCLUSION

The study proves that upper limb exercises along with 10 minutes tread mill is effective in improving the autonomic nervous controlling COPD patients .So this method can be used as an effective treatment program in improving the autonomic nervous control in COPD patients. This helps the patient to improve the tolerance to exercise and other functional activities. So this method is introduced as a safe and most effective treatment in management of COPD.

CHAPTER IX

LIMITATIONS AND SUGGESTIONS

LIMITATIONS

The sample size was small.

The treatment duration lasted for only 8 weeks.

Only two outcome measures were taken for the study

Only male subjects were included in the study.

The subjects do not have any follow up programme.

SUGGESTIONS

Studies with larger samples are recommended.

The further studies can be done with longer duration.

Further studies can be done with few more outcome measures, such as dyspnoea and lung volumes.

A follow up programme may be useful

Study should be conducted on both genders to find out whether there is any difference in the results between the two groups

CHAPTER X

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CHAPTER XII

APPENDIX I

INFORMED CONSENT TO PARTICIPATE IN THE RESEARCH STUDY

PATIENT CONSENT FORM

TITLE

Efficacy of Upper Limb Exercise and 10 minutes Treadmill Training on Improving Autonomic Nervous control in patients with COPD.

INVESTIGATOR: _ _ _ _ _ _ _ _ _ _ _

PURPOSE OF THE STUDY:

I_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ,have been informed that this study will work towards achieving on the functional activities of daily living in post-stroke conditions for me and other patients.

PROCEDURE:

Each term of the study protocol has been explained to me in detail. I understand that during the procedure, I will be receiving the treatment for one time a day. I understand that I will have to take this treatment for four weeks.

I understand that this will be done under investigator, _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ supervision. I am aware also that I have to follow therapist's instructions as has been told to me.

CONFIDENTIALITY:

I understand that medical information provided by this study will be confidential. If the data are used for publication in the medical literature or for teaching purposes, no

names will be used and other literature such as audio or video tapes will be used only with permission.

RISK AND DISCOMFORT:

I understand that there are no potential risks associated with this procedure, and understand that investigator will accompany me during this procedure. There are no known hazards associated with this procedure.

REFUSAL OR WITHDRAWAL OF PARTICIPATION:

I understand that the decision my participation is wholly voluntary and I may refuse participate, may withdraw consent at any time during the study.

I also understand that the investigator may terminate my participation in the study at anytime after researcher has explained me the reasons to do so.

I _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ have explained to ……. the purpose of the research, the procedures required and the possible risks and benefits, to the best of my ability.

…… ……

Investigator Date

I ……. Confirm that researcher has explained me the purpose of the research, the study procedure and the possible risks and benefits that I may experience. I have read and I have understood this consent to participate as a subject in this research project.

…….. ……

Subject Date

…….. …….

Signature of the Witness Date

APPENDIX II

CASE ASSESSMENT PROFORMA

SUBJECTIVE ASSESSMENT

Name :

Age :

Sex :

Occupation :

Address :

IP/ OP Number :

Date of evaluation :

Chief complaints

HISTORY

Past medical history :

Present medical history :

Onset :

Duration :

Surgical history :

Drug history :

Personal history :

ASSOCIATED PROBLEMS:

Vital signs

- Temperature :
- Pulse rate :
- Respiratory rate :
- Blood pressure :

	HEART RATE	SPO_2
PRE TEST		
POST TEST		

Physical therapy student

Signature